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ABSTRACT

A 3-year project was undertaken to develop, implement, and evaluate a program to reduce computerphobic reactions among postsecondary education students. The Model Computerphobia Reduction Program was designed to screen potential computerphobic students in their computer courses at the beginning of a semester and invite them to participate in brief skills-acquisition modules (treatment programs). After screening over 1,600 students, nearly 2[illegible] students, faculty, and staff of California State University, Dominquez Hills, volunteered for the program. The many others who needed the program, but chose not to participate, were used as a comparison group. Extensive short- and long-term evaluation, which used measurement scales and qustionnaires completed before and after the program and 6 months later, demonstrated strong, positive results. Highlights of the results include: (1) a 92% completion rate; (2) strong measurable objective and subjective gains; and (3) maintenance of gains over 6 months. Two comparison studies revealed markedly reduced anxiety, enhanced attitudes and cognitive abilities, and drastically reduced course dropout rate and improved course grades. (GL)

Cover Sheet

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California State University, Dominguez Hills
Psychology Department
1000 E, Victoria Street
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A MODEL PROGRAM FOR COMPUTERPHOBIA REDUCTION

Over three years we designed, field-tested and evaluated a Model Computerphobia Reduction Program. The program included classroom computerphobia screening; brief skills-acquisition modules that were tailored to specific computerphobic types and delivered to nearly 200 students, faculty and staff; a graduate student intern-training program; world-wide dissemination; and long-term quantitative and qualitative evaluation. Results clearly indicated: (1) a 92% completion rate; (2) strong measurable objective and subjective gains; and (3) maintenance of gains over six months. Two comparison studies revealed markedly reduced anxiety, enhanced attitudes and cognitions, drastically reduced course dropout rate and improved course grades.

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PROJECT REPORTS AND PRODUCTS:

Rosen, L D , Sears, D.C., & Weil, M.M. (1987). Computerphobia Measurement. A manual for the administration and scoring of three instruments: Computer Anxiety Rating Scale (CARS), Attitudes Toward Computers Scale (ATCS) and Computer Thoughts Survey (CTS). Available from the authors at California State University, Dominguez Hills, Psychology Department, 1000 E. Victoria, Carson, CA, 90747.

Rosen, L.D., Sears, D.C., & Weil, M.M. (1987). Computerphobia. Behavior Research Methods, Instrumentation and Computers, 19 (2), 167-179.

Rosen, L.D., Weil, M.M. and Sears, D.C. (1987). Computerphobia. MicroPsych Network, 3(2), 26-28.

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Rosen, L.D., Sears, D.C., & Weil, M.M. (1989). The Model Computerphobia Reduction Program: A Longitudinal Evaluation. Available from the authors at California State University, Dominguez Hills, Psychology Department, 1000 E. Victoria St., Carson, CA 90747

PROJECT REPORTS AND PRODUCTS (continued):

Weil, M.M., Rosen, L.D., & Sears, D.C. (1987). The Computerphobia Reduction Program: Year 1. Program development and preliminary results. Behavior Research Methods, Instrumentation and Computers, 19 (2), 180-184.

Weil, M.M., Rosen, L.D. & Shaw, S. (1988) Computerphobia Reduction Program: Clinical Resource Manual. Available from the authors at California State University, Dominguez Hills, Psychology Department, 1000 E. Victoria St. Carson, CA, 90747.

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Project Overview

The goal of this three-year project was to develop, implement and evaluate a program to reduce computerphobic reactions among postsecondary education students. Based on five years of earlier work, our research group and others across the United States, had determined that large numbers of university students avoid computer interaction because of what the literature has called "computerphobia." Our Model Computerphobia Reduction Program was designed to screen potential computerphobic students in their computer courses at the beginning of a semester and invite them to participate in our brief, skills-acquisition modules (treatment programs). After screening over 1,600 students, nearly 200 students, faculty and staff of our urban university volunteered for the program. The many others who needed the program, but chose not to participate, were used as a comparison group.

Extensive short- and long-term evaluation demonstrated strong, positive results highlighted by: (1) a 92% completion rate; (2) strong measurable objective and subjective gains; and (3) maintenance of gains over six months. Two comparison studies revealed markedly reduced anxiety, enhanced attitudes and cognitions, drastically reduced course dropout rate and improved course grades.

Purpose

The Model Computerphobia Reduction Program obviously addressed "computerphobia." However, the truth is more complex. When we began the program we had created, validated and extensively used two instruments to measure computer anxiety and computer attitudes. This approach to computerphobia was novel at the time since previous attempts to measure this construct were performed with a single, unidimensional scale of computer attitudes. When we began to develop and pilot test our program we realized that we needed a third instrument to measure computer cognitions. With this new measurement tool we were able to partition computerphobics into three types: (1) Anxious Computerphobics who exhibited the classic signs of anxiety disorders (e.g., sweaty palms, racing heart, blank mind) when working on a computer; (2) Cognitive Computerphobics who were incapable of working with computers because they bombarded themselves with a steady stream of negative internal dialogue (e.g., "I'll never learn how to do this!"; "I'm sure that I'll

push the wrong button and break this machine!"); and (3) Uncomfortable Users who simply lacked adequate information about computers and support from fellow students. With this definitional criterion established we created three skills-acquisition modules for the three different types of computerphobics.

Background and Origins

Our university caters to the nontraditional urban student. Most of the students are first generation college students who come from a less than affluent background. The typical student is a Black woman in her 40's returning to school after her children have grown. The university itself is small which provided an ideal setting for our program since "clinically-oriented" programs must, by their nature, be promoted by word-of-mouth and positive recommendations from service users.

Perhaps our biggest difficulty was our naivete. We begin the project assuming that all we needed to do was to open our doors and students would clamor for the services. We anticipated serving 600 students over the three years. Needless to say, we were shocked that our students did not flock in droves to our offices. Over the years we realized (through countless campus meetings and various successful and unsuccessful strategies) that today's student does not want to take extra time for a program of unknown value. Consequently, we discovered that we needed to rely on the faculty and campus administration to convince students of the worth of this service. We found the faculty and administration to be overwhelmingly helpful in this endeavor and were able to attract nearly 200 students to our program.

Project Description

This project included five major (interdependent) components: (1) student outreach; (2) graduate-student internship; (3) skills acquisition modules; (4) faculty development and (5) short- and long-term evaluation. Student outreach was primarily accomplished by in-class screening where students taking a course using computers would complete a brief screening packet the first week and would receive a personal "Computer Comfort Profile" a week later indicating their level of computerphobia. Students were urged to use our services by both a program intern and the course instructor. Over two years of classroom testing, 1,617 students in 76 courses were screened.

Over the three years, nine graduate students were trained to deliver the skills-acquisition modules. Extensive use of videotape facilities assisted the Clinical Director in individual and group supervision. Two skills acquisition modules were individualized to be delivered by one intern to one client. The third module was delivered to small groups. In all, 166 treatments were delivered including 93 groups and 73

individual modules. Each module required only 5 hours, usually delivered over five weeks. Campus faculty were involved in the program in three ways: (1) classroom testing, (2) a program open house and (3) a program luncheon. Overall, about one-third of the campus faculty were involved in the program.

Program effects were extensively evaluated both objectively and subjectively. Measurement scales and questionnaires were completed before and after the program and six months later. Two comparison studies were used to highlight program effects.

Project Results

Program participants showed dramatic changes. Nearly all students (92%) who began the program completed the program with decreased anxiety, improved attitudes and more positive cognitions. Compared to matched classmates, students dramatically reduced their chances of failure and/or dropout and improved their course grades. Long-term evaluation clearly demonstrated maintenance of these changes and continued improvement in computer utilization.

Campus-wide the program has changes opinions and future plans for computer applications. No longer do faculty and administration talk about random computer proliferation without asking how these changes will affect the students "psychologically." On a national level, the effects of our program are beginning to spread. As part of our program we have allowed any colleague to administer our computerphobia measures to students at their university. Currently, 42 colleagues at universities across the world are using these measures. Some have expressed interest in adopting a version of the program itself on their campus and we are continuing to work in this direction.

We are currently beginning the second phase of a project to replicate our work in the Los Angeles Unified School District. Thus far, through two university-funded grants, we have adapted our measures for school teachers and administered them to a pilot sample of 102 elementary and secondary school teachers. Over the next six months we will be administering the measures to a large, cross-sectional sample of all teachers in the district followed by the proposal of a version of the Computerphobia Reduction Program as a teacher workshop.

Summary and Conclusions

We have clearly demonstrated that computerphobia can be assessed and treated in a brief time. The results of our evaluation have shown that this program is remarkably effective, changing computerphobics into technological converts. As computers proliferate in the secondary and postsecondary schools it has become clear that a substantial subgroup has difficulties with this new technology. Our program is one successful answer to that problem.

A MODEL PROGRAM FOR COMPUTERPHOBIA REDUCTION

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Telephone Number: (213) 516-3427

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Extensive short- and long-term evaluation demonstrated strong, positive results highlighted by: (1) a 92% completion rate; (2) strong measurable objective and subjective gains; and (3) maintenance of gains over six months. Two comparison studies revealed markedly reduced anxiety, enhanced attitudes and cognitions, drastically reduced course dropout rate and improved course grades.

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"I'm sure that I'll push the wrong button and break this machine!"); and (3) Uncomfortable Users who simply lacked adequate information about computers and support from fellow students. With this definitional criterion established we created three skills-acquisition modules for the three different types of computerphobics.

In retrospect, after completing this project, it is not clear that we couldn't combine the three skill-acquisition approaches into one, unified approach. Our strategy was to try to treat each of the two most needy types of computerphobics - Anxious and Cognitive - with individualized attention. After examining the profiles of these types of computerphobics and comparing the similarities and differences in their individualized programs, it has been suggested that we might compile the two individualized approaches with the group approach into one, group program. Clearly this would be more cost effective since with the individualized approaches we were only able to work with one person while a group program worked with anywhere from two to eight students. However, we would not want to invoke cost and time constraints in place of program efficacy. Thus, it would be important to test whether such a group approach would show as strong positive changes as individualized approaches for highly computerphobic people. Although the data are limited, some highly computerphobic people did participate only in a group

program and did, it appears, benefit as much as those in an individualized program.

One note must be made about institutional attitudes. In the beginning of our project it was difficult to convince those faculty and administrators who were comfortably using computers that some (maybe, many) students were too uncomfortable to do what they thought was an easy task. It took several years and many testimonials to convince these technophiles that technophobes exist. Faculty began to look for them in their classroom and notice that they seemed to be well-represented. Administrators began to notice that their clerical staff were not all that comfortable around these marvels of science. One by one they came over to our side. When the FIPSE funding stopped and we decided to close our doors (for awhile) and take stock of future directions, faculty begged us to come to their classrooms and test their students. They didn't care if we couldn't treat the students; they just came to rely on the testing results to assist their classroom educational process.

The administration literally scoffed at the idea of a "Computerphobia Program" when we started. We had trouble getting the Vice President to sign our original FIPSE proposal stating that he would commit one-ninth of a faculty position for one year! By the end of the third year we had most of the administration applauding our efforts and this year, I think based on our work and visibility, I was awarded the "Outstanding Professor" Award. The same Vice

President who fought us so hard three years ago wrote a glowing letter about the program and my work.

Background and Origins

Our university caters to the nontraditional urban student. Most of the students are first generation college students who come from a less than affluent background. The typical student is a Black woman in her 40's returning to school after her children have grown. The university itself is small which provided an ideal setting for our program since "clinically-oriented" programs must, by their nature, be promoted by word-of-mouth and positive recommendations from service users.

Perhaps our biggest difficulty was our naivete. We begin the project assuming that all we needed to do was to open our doors and students would clamor for the services. We anticipated serving 600 students over the three years. Needless to say, we were shocked that our students did not flock in droves to our offices. Over the years we realized (through countless campus meetings and various successful and unsuccessful strategies) that today's student does not want to take extra time for a program of unknown value.

Consequently, we discovered that we needed to rely on the faculty and campus administration to convince students of the worth of this service. Accordingly, our primary effort in the early years was to get faculty and administrators to acknowledge and support our program.

This was perhaps our most difficult task. We met with administrators in every department and talked personally with nearly every campus staff member, including secretaries, department chairs, etc. It wasn't until the program started showing strong results that we were able to take our effort to the faculty. Based on the first year's data we contacted every instructor who taught any course that used computers. This cut across all disciplines including social sciences, management, life sciences, etc. We bombarded these faculty with letters, phone calls, etc. We literally twisted arms to let us come into the classes and administer our screening measures. We held a luncheon where 35 colleagues ate a free lunch and heard our plea for assistance. We held an open house where we gave tours of our facilities to more than 40 faculty and administrators. Slowly, our efforts began to pay off, and by the end of the third year we were screening as many students as we could handle with our staff.

Project Description

This project included five major (interdependent) components: (1) student outreach; (2) graduate-student internship; (3) skills acquisition modules; (4) faculty development and (5) short- and long-term evaluation.

Student Outreach. The Model Computerphobia Reduction Program developed a two-tiered strategy for computerphobia assessment. At the beginning of each semester classes with

computer interaction were targeted across the university campus. Classes in all units were considered as long as the students in the class anticipated any computer interaction. Each instructor was contacted individually and permission was granted for a graduate-student intern to administer an "In-Class Screening Packet" the first week of class. This packet included an informed consent form, the Computer Anxiety Rating Scale (CARS) and the Computer Thoughts Survey (CTS).

Within a week the graduate-student intern returned to the class and gave each student a personalized "Computer Comfort Profile". This profile sheet had two "thermometers" which were filled in with red ink to indicate the student's personal level of computer anxiety and computer cognitions. Levels were designated as no anxiety, low anxiety, moderate anxiety and high anxiety for the CARS and positive, slightly negative, moderately negative or extremely negative cognitions for the CTS. The three highest levels for each scale were indicated as "At-Risk" for computerphobia. A section labelled "Interpretation" summarized the possible manifestations of the "at-risk" scores and suggested that the person contact the program for further assistance. The intern also briefly discussed the profile form and assured the students that a large number of other students have tested in the "at-risk" range and have received help in a timely fashion.

In all, over four semesters, 1,617 students in 76 courses were given this In-Class Screening Packet and Computer Comfort Profile. Students were screened in courses across campus units including: education (21 courses; 421 students); social sciences (30 courses; 595 students); sciences (2 courses; 36 students); management (21 courses; 541 students) and interdisciplinary studies (2 courses; 24 students). Records were kept of all assessment results including CARS and CTS scores and final course performance.

As mentioned earlier, this referral base was built up gradually over the years beginning with instructors in our department and extending slowly to other departments and areas. Other referrals began to come from different sources as the word spread about the program. We used the campus media to its full extent, having articles in the campus newspaper and notices on all bulletin boards. We placed posters with detachable flyers near any campus computer and contacted any administrator who was responsible for these computers. We held meetings each semester with student assistants in the computer center and the tutoring center as referral sources and met yearly with student assistants in areas such as the counseling center, student development center, advisement center, library, etc. We also placed a sandwich board outside our offices with detachable flyers and had a table set up at registration with interns fielding questions and distributing flyers.

If the student contacted the program she was given several additional assessment instruments including the Attitudes Toward Computers Scale (ATCS) and the Confidential Intake Form for Computerphobia Program. This latter form elicits demographic data including: age, ethnic background, previous counseling and therapy history, academic major and minor, and units completed. Additional self-ratings were obtained for computer knowledge, computer attitudes, computer anxiety and computer confidence plus checklists for anxiety reactions and negative cognitions. The final questions assessed computer experience in the student's personal, academic and career life.

Although this two-tiered plan of assessment provided the major source of clientele for the program some potential clients contacted the program directly. These people were invited to the program office to complete all measures. Results were communicated through the Computer Comfort Profile in a personal appointment with an intern during the following week.

Internship. Over the three years, nine graduate students were trained to deliver the skills-acquisition modules. Extensive use of videotape facilities assisted the Clinical Director in individual and group supervision. During the first two years the Clinical Director held five half-day workshops to train the interns with role-playing exercises and reading assigned between weekly workshops. During the actual application of the skills modules interns

videotaped their sessions through two-way mirrors and were critiqued individually and in a group format weekly. These sessions were extremely helpful in shaping the program and its application.

Treatment Program. Two skills-acquisition modules were individualized to be delivered by one intern to one client. The third module was delivered to small groups. In all, 166 treatments were delivered including 93 in groups and 73 in individual modules . Each module required only 5 hours, usually delivered over five weeks.

The Anxious Computerphobic is one who exhibits the classic signs of an anxiety reaction including sweaty palms, heart palpitations, headaches, etc. when facing computer interaction. This person was assigned to an individualized Systematic Desensitization (SD) program. First, the client and a graduate-student intern worked together to develop a personal hierarchy of scenes depicting increasing levels of interaction with her feared object or situation. Second, the client was taught to relax completely. Finally, the client progressively paired the newly learned relaxation response with the imagined scenes, practicing relaxing with each new scene. As the client learned to relax with progressively more uncomfortable scenes she developed the ability and desire to approach and interact with the previously feared object or situation.

The Cognitive Computerphobic is one who, on the surface, seems calm and relaxed. However, internally, this

computerphobic is bombarding herself with negative messages such as "Everyone else knows how to do this but me!" or "I'm going to hit the wrong button and mess up the machine!" This type of computerphobic was assigned to an individualized Thought Stopping/Covert Assertion(TS/CA) program. Working with a graduate-student intern, the client made a list of the internalized negative self-statements. Using thought stopping the client learned to stop these messages and leaves an internal void which was formerly occupied by the steady stream of negative cognitions. Next, using covert assertion, the client developed positive, motivating self-statements and learned to internalize them to fill the void. As the client learned to stop the negative thoughts and replace them with positive, motivating self-statements, she was able to approach a computer interaction with confidence and hope.

An Uncomfortable User is a person who may be slightly anxious or use some negative self-statements, but is generally not in need of individualized attention for these problems. Instead, this person simply lacks information about computers and support for her concerns, so she was assigned, with several other similar students, to an Information/Support (I/S) Group. This group is designed to provide specific information about computers including myths and realities about technology, future prospects for technology and actual computer parts and their functions. The group is partly structured (with specific exercises) and

partly unstructured to allow room for self-disclosure, discussion, problem solving and skills acquisition. The group attempts to provide a feeling of "universality" for the Uncomfortable User by demonstrating that she is not alone in her discomfort and confusion.

Evaluation. Program effects were extensively evaluated both objectively and subjectively. Measurement scales and questionnaires were completed before and after the program and six months later. Two comparison studies were used to highlight program effects. Following the completion of the final treatment session, a separate session was scheduled for posttesting within one week. If the student was involved in two overlapping treatments (individual and group) she would receive the posttests following the final session of the final treatment program. If the student was involved in two consecutive treatments she would take a posttest after each treatment program was completed.

The posttest packet consisted of the CARS, CTS and ATCS plus a Post-Treatment Questionnaire. This Post-Treatment Questionnaire included the same self-ratings as the pretest questionnaire plus additional questions that assessed a general notion of what the client gained from the program and specific examples of skill utilization in the client's personal life, academic life and job or career.

Six months after the client completed her program, she was contacted by mail to participate in the follow-up assessment. The follow-up questionnaire packet included the

CARS, CTS and ATCS plus a Six-Month Follow-Up Questionnaire. This latter instrument included the same self-ratings as the pretest and posttest questionnaires, plus additional questions that assessed computer interactions that had occurred in the previous six months, perceived program effectiveness, and skill utilization. If the client did not respond within two weeks a reminder letter was mailed. If the client still did not respond in an additional two weeks a personal phone call was placed to the client or to a reference person listed on the pretest questionnaire. If necessary, an additional packet was mailed.

Project Results

Program participants showed dramatic changes. Nearly all students (92%) who began the program completed the program with decreased anxiety, improved attitudes and more positive cognitions. Compared to matched classmates, students dramatically reduced their chances of failure and/or dropout and improved their course grades. Long-term evaluation clearly demonstrated maintenance of these changes and continued improvement in computer utilization.

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have allowed any colleague to administer our computerphobia measures to students at their university. Currently, 42 colleagues at universities a oss the world are using thes measures. Some have expressed nterest in adopting a version of the program itself on their campus and we are continuing to work in this direction.

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Summary and Conclusions

We have clearly demonstrated that computerphobia can be assessed and treated in a brief time. The results of our evaluation have shown that this program is remarkably effective, changing computerphobics into technological converts. As computers proliferate in the secondary and postsecondary schools it has become clear that a substantial subgroup has difficulties with this new technology. Our program is one successful answer to that problem.

We have developed a manual (Weil, Rosen & Shaw, 1988) to enable any university to establish their own Computerphobia Reduction Program. This manual describes, in detail, student outreach, faculty development, treatment program application and evaluation including all forms and instruments. With this manual a university can begin to think about establishing their own program. However, other, somewhat intangible issues, must be considered. First, what is the climate of the university toward computing? Is this university intending to increase computing facilities over the next five years? Does the administration intend to have computing a vital component of many courses? If so, then it is imperative to determine which faculty are taking an active role in this application of technology. It is probably less useful to work through the computer center and more useful to work through individual faculty who have directly experienced the problems of incorporating computers into their curriculum. Our best contacts were faculty in business and the social sciences, so this might be a good place to begin.

My final recommendatior would be to plan to phase-in implementation over a period of at least two years and perhaps three. It wasn't until the middle of the second year of our project, after massive public relations efforts, that we were able to become known as a positive campus service. We foolishly believed that this service program

would be welcomed with open arms and this caused us much grief and soul-searching.

A final note concerns the future of computing in postsecondary institutions. The goal of most postsecondary institutions is to have computers become an active part of teaching. Many instructors that we have spoken with firmly believe that "computerphobia" will disappear with the rapid increase of classroom computing. Further, most have told us that as computers become more popular in elementary and secondary schools this "disease" will be cured by early experiences. We vehemently disagree. First, computerphobics will still be able to avoid most interactions with computers and, we believe, will actively do so. Second, students coming through the public school system are faced with two roadblocks: (1) inequitable distribution of computing resources and (2) computerphobic teachers. It has clearly been shown that the technological revolution is creating the "haves" and the "have nots" with respect to computer experience. As expected, the "haves" are heavily represented by affluent White males while the "have nots" include mainly poor non-White females. Furthermore, our research and that of others has shown that many teachers are computerphobic and that these teachers are modeling computerphobics responses in their (her) school children.

Computerphobia will not simply disappear like polio. Our program needs to be translated for various populations

and implemented in secondary and postsecondary systems alike.

APPENDIX

Overall, I found that FIPSE was extremely helpful in several ways. First, the FIPSE project directors meetings were useful, in my case, to spread some propaganda about computerphobia among other technologically-oriented FIPSE projects. This gave me time to pursue other universities who might be interested in our computerphobia measures and program. Second, my first FIPSE program officer, Felicia Lynch, was incredibly supportive of our efforts. From the beginning Felicia was one of the few FIPSE program officers who saw the value of our work. She, in turn, convinced other FIPSE staff that what we were doing would dovetail nicely with their work. Finally, FIPSE was also helpful in organizing the FTSG study group. This allowed us a forum to spread our views among projects with similar interests.

FIPSE has gone through many changes since we applied for our grant. Some of these changes have directly, and adversely, impacted our program. First, and foremost, was the continual staff changes. In the three years we had three program officers. When a new officer arrived on the scene it would take a few months to acquaint the person with our project and its special concerns. By that time, the current officer was already planning to move on to another job and a new officer was in the offing. Second, FIPSE changed directions and started funding fewer and fewer technologically-oriented projects as our project progressed. I feel that this was a mistake for FIPSE and, inadvertently, a disservice to our project. I feel that it was a mistake for FIPSE because technology is the wave of the future in education and for

FIPSE, the most risk-taking funding group, to ignore this movement is ill-advised. The move was a disservice to our project since it removed new sources of influence that our project might have had on upcoming technology programs. We have found that our influence has been quite profound when we can discuss our concerns with projects that are just beginning. FIPSE essentially removed the source of those new projects. I hope that FIPSE will renew its commitment to technology and continue to increase its funding in this area.

If, and when, FIPSE chooses to renew its interest in technology projects, I feel that it would be appropriate and essential for the project proposals to address the psychological issues that confront the computer user. In addition, it is imperative that the project be cognizant of the inequities in the distribution of computing resources and address that issue in its proposal. Considering the results of our project, it is essential that any technology project, at a minimum, assess the level of computerphobia among its participants (including relevant faculty, staff and administrators). This assessment will at least indicate, in advance, whether the program needs to address the issue of computerphobia in its plan. As experts in this area, we would be happy to assist any project that wishes to pursue this psychologically-healthy path.

The attached volumes include a manual that details how to establish and maintain a Computerphobia Reduction Program and a report on the success of our program. We invite comments as we prepare both of these works for publication.